

GOAT MILK SOAP FROM EXPIRED POWDERED MILK

Rosliza Ali*, Norsakina Zurina Zulkifli, Nunshaimah Salleh, Adibatul Husna Fadzil, Yanti Yaacob,
 Nordiana Suhada Mohmad Tahirudin
 Faculty of Applied Sciences, Universiti Teknologi MARA, Perak Branch Tapah Campus, 35400 Tapah Road,
 Perak, Malaysia.

*rosliza_ali@uitm.edu.my

Abstract: This study aims to formulate the goat milk soap using expired powdered milk and study the effectiveness of the soap. The expired powdered milk was weighed, dissolved with distilled water and frozen prior to use. The frozen milk was mixed with caustic lye. The combination of coconut oil, olive oil and franch oil in variable amounts was prepared and added to the milk-lye mixture. The mixture solution was carefully stirred with a hand mixer until the batter became thicker. Few drops of fragrance oil was added to enhance the aroma. The findings indicate that F3 had better hardness, scent, and solubility properties than other soap formulations.

Keywords: *Expired powdered milk, goat milk soap, cow milk soap, hand made soap*

INTRODUCTION

The incorporation of expired milk powdered in the process of soap production presents significant advantages in terms of mitigating food waste. Through the process of repurposing underutilised ingredients, we could efficiently address the environmental ramifications that are linked to the disposal of food. Instead of disposing of milk powdered that has expired, it can be included into the making of soap, so reducing waste and optimising its utility. The conversion of these substances into soap serves to enhance their functioning and intrinsic worth. This strategy actively advocates for the implementation of a circular economy, which entails reducing the overall quantity of food waste produced and offering an environmentally aware alternative to the conventional constituents used in soap production.

Soap is a skincare product that is manufactured through the process of saponification. Saponification is a chemical process that involves the reaction between fatty acids and base molecules, specifically sodium hydroxide (NaOH) and potassium hydroxide (KOH). The alkali will be subjected to heat in order to react with the oil in the soap formula (Febriani et al., 2020). In the present study, a soap formulation was developed utilising goat powdered milk that had reached its expiration date as the primary constituent. To make this overdue powdered milk soap seem neutral, no artificial colour is added.

Goat milk is known for its high content of vitamins D, A, and B6, which have been found to possess reparative properties for injured skin cells. Vitamins, minerals, and antioxidants are all more concentrated in goat milk, while the lactose content is lower. Goat milk also has higher concentrations of six of the ten necessary amino acids than does cow's milk (Kumar et al., 2016).

In the realm of skincare, milk soap has garnered considerable attention due to its distinctive natural composition, which renders it remarkably advantageous for the skin. Milk soap possesses advantageous attributes due to its substantial concentration of vitamins, minerals, proteins, and natural fats, notably vitamins A, B2, B6, and B12 which contribute to the promotion of skin health.

METHODOLOGY

Sample Collection and Preparation

The expired powdered pure goat milk was provided by Suffy Dairy Group Sdn Bhd. The goat milk soap was made by a cold process method. The powdered milk was dissolved with distilled water and was frozen first prior to use. The lye was carefully measured and poured into the milk. Then, the mixture was stirred quite a bit with a hand mixer, and almost instantly the ice started to melt and the milk was heated up. Mixing these two components together would create both soap and glycerin and the glycerin left acts as a moisturizing agent. The milk-lye mixture then was set aside. A mixture of olive oil, coconut oil and franch oil with variable amounts was prepared and added to the milk-lye mixture and everything should be melted. The batter would thicken slightly and leave trails when stirred. Next, a few drops of fragrance oil were added to the batter. Immediately, the batter was poured into the mold and the top was smooth. After 24 hours, the soap was turned out of the mold, cut into bars, and stored in a well-ventilated space until it was ready for use.

Formulation of Goat Milk Soap

Three different compositions of soap containing essentially olive oil, coconut oil and franch oil were prepared and were formulated with different amounts of goat powdered milk for comparative study.

Evaluation of Physical Parameters

The physical test was divided into six distinct components, namely pH, hardness, solubility, allergy, fragrance, and foam testing. The goat milk soap bar was divided into individual pieces of 2x2 cm in order to conduct a solubility test. Subsequently, the sample was immersed in a solution of 100 mL of distilled water and observed at regular intervals of 30 minutes until complete dissolution was achieved. Ten panellists participated in the allergy, fragrance, hardness level, and foam tests. A bar of goat milk soap was distributed to each member of the panel. Participants are required to administer the soap onto their hands over the course of seven consecutive days. The pH of the goat milk soap was determined by employing a pH metre probe. The pH level was determined after complete dissolution of the soap in 100 mL of distilled water.

FINDINGS

Table 1 illustrates the composition of the three formed samples, namely F1, F2, and F3. The results of the study indicate that F3 exhibited superior soap formulation characteristics in terms of hardness, fragrance, and solubility. The F3 sample demonstrated optimal suitability for application on the skin.

Table 1. Composition of soap

Materials	F1	F2	F3
Coconut oil	30	35	40
Olive oil	7	8	10
Franch oil	10	7	5
Caustic lye	9	9	9
Distilled water	18	10	8
Goat powdered milk	25	30	27
Peppermint oil	1	1	1

Table 2. Physical parameters of soap

Sample	Hardness Level	pH	Solubility	Aroma	Foam	Allergy
F1	Slightly soft	7.22	Dissolve in 2.5 hours	Slightly fragrance	Less foam	No
F2	Slightly soft	6.93	Dissolve in 2.5 hours	More fragrance	Less foam	No
F3	Slightly hard	6.59	Dissolve in 3 hours	Slightly fragrance	Less foam	No

Table 2 displays the physical characteristics of goat milk soap. The pH values of the soaps varied between 6.5 and 7.2. The significance of the pH value lies in its direct influence on the skin's health, as the pH of a product can have a substantial impact on the skin. The degree of hardness shown by the soap sample was found to be correlated with its water content. According to a study conducted by Fatchiyah et al. (2023), the hardness of soap might be affected with prolonged storage durations. The soap composed of powdered goat milk exhibits a subtle scent. The incorporation of peppermint oil serves to augment the olfactory properties of goat milk soap. The colour of the soap was also influenced by the components present in the soap composition. The goat milk soap exhibited a yellow colour. According to the comments provided by the panellists, it was observed that goat milk soap did not exhibit any skin irritating effects during a one-week duration.

CONCLUSION

In conclusion, F3 sample formulation exhibits superior characteristics when compared to the other two sample formulations. The pH value of the F3 sample was found to be optimal for its application on the skin. Further research is required to ascertain the moisture levels, conduct total plate count tests, and assess antimicrobial activity in order to guarantee the safety of the product for human consumption.

REFERENCES

- Fatchiyah, F., Elsa Rahmania Criswahyudianti, Nia Kurnianingsih, Ema Pristi Yunita, Regina Putri Virginia,. 2023. Antimicrobial activity and stability evaluation of soap from caprine milk, yogurt, and kefir. *Journal of King Saud University – Science* 35, Issue 8, 102908.
- Febriani, A., Syafriana, V., Afriyanto, H., Djuhariah, Y.S., 2020. The utilization of oil palm leaves (*Elaeis guineensis* Jacq.) waste as an antibacterial solid bar soap. *IOP Conf. Ser.: Earth Environ. Sci.* 572, 1–10.
- Kumar, H., Yadav, D., Kumar, N., Seth, R., Goyal, A.K., 2016. Nutritional and nutraceutical properties of goat milk. *Indian Journal Dairy Sci.* 69 (5), 513–518.

Surat kami : 700-KPK (PRP.UP.1/20/1)

Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak



Tuan,

PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK MELALUI REPOSITORI INSTITUSI UiTM (IR)

Perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

“BERKHIDMAT UNTUK NEGARA”

Saya yang menjalankan amanah,

Setuju.

27.1.2023

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

PROF. MADYA DR. NUR HISHAM IBRAHIM
REKTOR
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR

nar